

AUSTRALIAN SHELLS OF THE FAMILY HALIOTIDAE

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[Read 12 August 1943]

PLATES XX TO XXV

Australia and New Zealand have the bulk of the world's species of the interesting family Haliotidae, commonly known in various parts of the world as Mutton Fish, Sea Ears, Ormers, Abalones, Awabi, Pauas, and Venus Ears. Before attempting to classify the family generically it is necessary to determine the genotype of the type genus *Haliotis*, which is a problem presenting considerable difficulties. The original description of *Haliotis* Linne 1758 is followed by the specific description of the species *H. midae* Linne 1758, without locality, though it is the well-known and peculiar shell found commonly in South Africa. This is the species accepted by Thiele, *Handbuch der Systematischen Weichtierkunde*, p. 29, 1929, as genotype. The next species listed by Linne is the well-known European *H. tuberculata* Linne 1758, which has also been regarded by certain writers as the genotype. Montfort, *Conchyliologie Systematique*, 2, 119, 1810, gives *H. asinina* Linne 1758 as the typical species, a course which is followed by Winckworth, *Journal Conchology*, 19, (7), 218. It seems that *H. midae* has first claim to be quoted as genotype of the genus *Haliotis*.

Haliotis australis Gmelin 1791 was recorded by Menke from Western Australia in error, as it is the well-known species widely distributed in New Zealand and bears no resemblance to any Australian species. *Haliotis pulcherrima* Martyn 1784 was reported from King George Sound also in error. Two young shells mounted on a tablet from the May Collection bear the locality "Australia." They are typical, but in all probability there has been a mistake in the locality, as the species is only known from the Polynesian Region.

KEY TO AUSTRALIAN GENERA

- a. Shell rounded.
 - b. Orifices small and not conical.
 - c. Shell smooth and large and medium height *Schismotis*
 - cc. Shell spirally lirate, small, high and circular *Exohaliotis*
 - bb. Orifices large and conical.
 - d. Dorsal surface with corded spirals.
 - e. Raised and prominent dorsal rib *Marinauris*
 - ee. No raised and prominent dorsal rib *Notohaliotis*
 - dd. Dorsal surface tuberculate *Ovinotis*
- aa. Shell very elongate ear-shaped *Tcinotis*

SCHISMOTIS Gray 1856

(Pl. xx)

Genotype, *Haliotis excisa* Gray 1856. A species based on a specimen which is a monstrosity with the perforations connected by a slit. Locality, ?.

This species was previously named *albicans* Quoy and Gaimard 1834, King George Sound, Western Australia. *Haliotis laevigata* Donovan 1808 is a still earlier name which may apply to this species but it is based on a figure without description or locality. The figure appeared in Rees' *Encyclopaedia*, November 1 1808, pl. vi of the *Conchological* series, and this was referred to by Iredale in *Proc. Linn. Soc. N.S.W.*, 1924, p. 222. The *Encyclopaedia* is not obtainable in South Australia but the Public Library of Melbourne has it and a photostat of

the plate is here reproduced to provide students with the record of this species. In South Australia the species grows bigger and heavier than any other and indeed is the largest species in Australia, if not in the world. A specimen from Anxious Bay, South Australia, measures 200 mm. x 155 mm. x 60 mm. Another from Robe measures 150 mm. x 150 mm. x 75 mm., and is a particularly high specimen. The species is found in deeper water and on open ocean beaches in the South-East and Southern Yorke Peninsula where, at the latter place, one farmer uses it as a scoop for removing the sandy soil from post-holes. It is also a common object on the native camp sites which abound in that district. It is rarer in the Gulf St. Vincent, where it is usually of a smaller size and uniformly white, even in the juvenile. From Yorke Peninsula westwards the young, and sometimes specimens approaching adult size, are decorated with irregular, alternate red and white radial flames, and the common "Bonnet Limpet," *Sabia conica* Schumacher 1817, is frequently attached to the dorsal surface of the body whorl. The orifices are very small and are connected by a weak groove and in beach rolled specimens or even well worn living specimens this may be eroded through to form a slit, a condition seen in the monstrosity *S. excisa* Gray. It is recorded from throughout the Flindersian Region.

TEINOTIS Adams 1854

Genotype, *Haliotis asinina* Linne 1758, "Indian Ocean."

The genus was introduced for the species *Haliotis asinina* Linne, which has an elongate shell with large aperture and the animal has a large foot. It is widely distributed in the Pacific and on the Northern Australian coasts. We have it from North West Islet (Kimber) and Murray Island, North Australia (A. M. Lea). As explained previously, Montfort 1810 cited this species as type of *Haliotis*, but Adams pointed out in introducing his genus that *asinina* is the genotype of the *Haliotis* of Montfort 1810 and not of the true *Haliotis* Linne 1758.

EXOHALIOTIS Cotton and Godfrey 1933

(Pl. xxiv, fig. 3)

Genotype, *Haliotis cyclobates* Peron 1816, Kangaroo Island—*excavata* Lamarck 1822, "Australia" (= South Australia).

This peculiar round, elevated species is confined to the eastern end of the Flindersian Region and no specimen or fragment can be found in the Verco Western Australian material. It is quite common in South Australia and is found from Streaky Bay to the South-East. A large specimen from Venus Bay (Weeding) measures 90 mm. x 75 mm. x 50 mm. The colour may be quite bright of a pale greenish background crossed by radial red and white stripes, or the shell may be unicoloured creamish-white. One specimen has the former colouration at first and then, after a repaired break in the body whorl, the pattern becomes abruptly unicoloured. The radula from a South Australian specimen shows some differences from that of *Marinauris roei*, the most notable being the narrower central tooth. A specimen from Corny Point, South Australia, is figured here.

NOTOHALIOTIS Cotton and Godfrey 1938

Genotype, *Haliotis ruber* Leach 1814, New South Wales.

Shells of this genus are usually large and have not the raised spiral rib of *Marinauris*. The species here placed under this genus are somewhat varied and may be arranged in two groups. There is the genotype with its associates *improbula* and *coccoradiatum* which tend to be elongate and raised dorsally. Then there is the *conicopora-vixlirata* type which is rounder, has a depressed dorsum and somewhat exert spire.

NOTOHALIOTIS COCCORADIATUM Reeve 1846

Type locality, "St. Vincent and Spencer Gulfs" = Port Jackson, New South Wales.

This is the well-known species which is found at Port Jackson, New South Wales, and has been also recorded from Tellaburga Island, Victoria. It is not found in South Australia or the Flindersian Region and is certainly confined to the Peronian. It is a much smaller species than *ruber*.

NOTOHALIOTIS CONICOPORA Peron 1816

(Pl. xxi)

Type locality, Pelican Lagoon, Kangaroo Island, South Australia.

Shell large, round, dorsal surface of body whorl depressed, spire prominent; spirally scabrously corded and irregularly axially undulate; orifices prominent and conical.

There is little doubt but that *granti* Pritchard and Gatliff, *gigantea* Menke and *cunninghami* Gray are synonyms, the species being well figured by Reeve under the last name from what appears to be almost certainly a South Australian specimen. A specimen from Guichen Bay, South-East South Australia, is here figured, and the size and locality records of some other Southern Australian specimens given, in millimetres.

	Max. Diam.	Min. Diam.	Height	
Beachport	175	135	43	Adult
Kangaroo Island	156	125	35	Adult
Middleton	105	90	25	
Guichen Bay	100	75	23	
Guichen Bay	140	110	37	Specimen Figured
Kangaroo Island	95	75	23	
St. Francis Island ...	72	55	17	
Victoria	140	110	35	
Victoria ...	140	115	39	

From *N. improbula* and *ruber* the present species is distinguished by the depressed dorsal surface, prominent spire and rounder shell.

Notohaliotis vixlirata sp. nov.

(Pl. xxii)

Ellenbrook, Western Australia. Holotype, D. 7962.

Shell large, dorsal surface depressed, spire elevated, orifices prominent and conical; spiral lirae very fine in the early stages of growth and obsolete in the later and adult stages when the accremental striae become more and more valid with age until they are strongly marked; no irregular axial ribs as in *conicopora*, though in general shape and size recalling that species. Major diameter 178 mm., minor 140 mm., height 51 mm. This species is readily separated from *conicopora* by the lack of both the strong scabrous spiral cords in the adult and the axial irregular undulations. The holotype specimen bearing the above name has been on exhibition in the South Australian Museum shell gallery since 1930. We have specimens in various stages of growth, from Albany and Esperance.

NOTOHALIOTIS IMPROBULA Iredale 1924

(Pl. xxiii)

Type locality, Port Fairy, western Victoria.

This species is undoubtedly closely allied to *N. ruber*. It differs in being more elongate, less tightly coiled showing the whorling inside, and having coarser sculpture as pointed out in the original description. In addition the Flindersian specimens attain to a larger size, a fully grown specimen from Beachport, South Australia, figured here, having the following measurements: maximum diameter 180 mm.,

minimum diameter 140 mm., height 50 mm. The species is widely distributed and common in the Flindersian Region, living specimens being always obtainable at such places as Marino Rocks, South Australia, between tide marks. The animal varies somewhat in the colouration of the foot, which on the under-surface may be sometimes predominately cream-coloured in the median area, and at other times predominately dark greyish-brown. It is active and will move about comparatively quickly on the inner glass surface of a marine aquarium jar.

NOTOHALIOTIS RUBER Leach 1814

Type locality, New Holland (= Port Jackson, New South Wales).

Haliotis naxvosa Martyn 1784 is a synonym, but invalid as Martyn's work was not binomial. A Tasmanian shell from the May Collection bears the label: "*Haliotis naxvosa* Martyn = *tubifera* Lamarck" and is undoubtedly *N. ruber*. This specimen agrees in size with *tubifera* Lamarck, but the meagre description of the species could apply equally well to *conicopora* as that species is recognised in this paper, but not as Iredale interprets it as of the group now called *Marinauris*. In any case *tubifera* will not be used in Australian lists, as it is apparently a synonym of *ruber* or *conicopora*. Furthermore, there is no suggestion in the original description that the species has anything to do with the genus *Marinauris*. It can only apply to a species of *Notohaliotis*. The type locality given by Lamarck for *tubifera* is "New Holland," but Iredale thinks Southern Tasmania may be the locality.

SANHALIOTIS Iredale 1929

Genotype, *Haliotis varia* Linne 1758. Locality, ? (= Philippine Islands).

Species are *Sanhaliotis aliena* Iredale 1929, Queensland, which we have from Groote Eylandt, Gulf of Carpentaria (Tindale) and North-West Islet, Capricorn Group (Kimber); *howensis* Iredale 1929, Lord Howe Island; *hanleyi* Ancey 1881, New Caledonia; *crebresculpta* Sowerby 1914, New Caledonia; *dissona* Iredale 1929, Michaelmas Quay, Queensland. In addition the following four species may also belong to this genus.

SANHALIOTIS SQUAMATA Reeve 1846

Type locality, North-west Coast of Australia.

This Dampierian species is closely allied to the next, *funeris* Reeve, though the author states that: "This is a larger and flatter species than the *H. squamata* and the ridges (spiral) are more widely separated and less squamate." We have a specimen from Shark Bay, Western Australia, which is probably its southern limit.

SANHALIOTIS FUNEBRIS Reeve 1846

Type locality, New Holland.

This species may be found only in South Western Australia, and is definitely recorded from Swan River, Western Australia, which according to Hedley is the locality placed on the specimen in the South Kensington Museum. There is little doubt but that *diversicolor* Reeve 1846, New Holland, and *tayloriana* Reeve 1846 Hab. ? are synonyms over which *funeris* has page priority. Incidentally, if *squamata* should prove synonymous it has priority over *funeris*.

SANHALIOTIS ASTRICTA Reeve 1846

Type locality, "Hab. ?"

This species appears in Hedley's "List of Marine Mollusca of Queensland," and the specimens in the South Australian Museum are from Port Darwin. It is probably a Dampierian species extending into the Banksian, but we have neither Queensland nor Western Australian specimens.

SANHALIOTIS ELEGANS Philippi 1899

Type locality, Western Australia.

Reeve quotes Port Adelaide, New Holland, but it has never been taken in South Australia. Our Western Australian specimens are typical and come from Rottnest Island. Verco, in his notes, states "Shark Bay (Henn.)" but I have not seen specimens from there. This is probably a Dampierian species ranging up to Northern Australia. It is placed in this genus although the elongate shape and terminal spire suggest that it should be separated under a distinct genus.

MARINAURIS Iredale 1927

(Pl. xxiv, fig. 1-2; pl. xxv, fig. 1-3)

Genotype *Marinauris melculus* Iredale 1927, Caloundra, Queensland = *Neohaliotis* Cotton and Godfrey 1938, genotype *Haliotis scalaris* Leach 1814, South Western Australia.

The genus may be described as follows:—Shell of medium size, flattened, circular, spire subcentral, slightly elevated; sculpture of more or less developed spiral cords and sometimes axial folds and a tendency to the development of a spiral median dorsal rib; orifice close and somewhat tubular; columellar plate wide and flat; internal colouration silvery, all whorls exposed. Distribution: all around the Australian and Tasmanian coastline. The radula of *Marinauris roei* Gray is here figured and shows the remarkably wide central tooth which may be typical of this genus. A specimen of the shell from Arno Bay, South Australia, where it is common, is also figured.

The genus *Padollus* Montfort 1810 has for its genotype *Haliotis rubicundus* Bolten 1798, which is probably the same species as *parva* Linne 1758 from South Africa. *Sulculus* Adams 1854 has *Haliotis incisa* Reeve, "Habitat?" for genotype, since this is the first species listed after the description of the genus. Also in the list is *parva*. The generic description furthermore leaves little doubt but that this genus is a direct synonym of *Padollus*. *Padollus* is therefore available for the African species which are small, depressed, and have a prominent spiral rounded rib on the dorsum, a fact which was mentioned by Iredale when he introduced *Marinauris*. Species belonging to this genus are: *Marinauris melculus* Iredale 1927, Caloundra, Queensland; *ethologus* Iredale 1927, Caloundra, Queensland; *hargravesi* Cox 1869, New South Wales, rare; *brazieri* Angas 1869, New South Wales; *roei* Gray 1826, South Western Australia = *scabricostata* Menke 1843, Mistaken Island, a species we have from Shark Bay (Ashby); *scalaris* Leach 1814, South Western Australia = *rubicundus* Gray 1826 (preocc. *rubicundus* Bolten 1798) = *tricastalis* Menke 1843, South Western Australia, figured here is a young example from Leven's Reach, South Australia, and an adult from Corny Point; *cinnac* Reeve 1846, "New Holland" (= South Australia), a closely allied species confined to the eastern end of the Flindersian Region, figured here from the Gulf St. Vincent.

Ovinotis gen. nov.

Genotype *Haliotis ovina* Gmelin 1791, habitat?

Reeve records this species from New Holland and the Philippine Islands. We have specimens from Torres Strait, North Australia, Murray Island and Lady Elliot Island (Lea).

Shell orbicularly oval, spire depressed, whorls plicately rayed with swollen wrinkles or knobs, orifices conical. Reeve remarks of this species: "An extremely characteristic species . . . neither Lamarck or Deshayes seem to have been acquainted with it." *H. concinna* Reeve 1846, from the Philippine Islands, also belongs here.

OVINOTIS DRINGI (Reeve 1846)

Type locality, North Coast of Australia.

This species does not appear to be represented in the South Australian Museum collection. According to Reeve's description it has the tuberculate sculpture of *ovina* and may be that species, though Reeve's figure probably depicts a juvenile which therefore looks different from *ovina*, the radial plications being undeveloped. *H. gemma* Reeve 1846, Habitat ? and *H. papulata* Reeve 1846, North Coast of Australia, are apparently synonyms.

Summing up, one may list the distribution of the Australian Haliotidae according to the various States as follows:

QUEENSLAND—*Marinauris melculus* Iredale, *ethologus* Iredale; *Teinotis asinina* Linne; *Sanhaliotis aliena* Iredale, *dissona* Iredale, *squamata* Reeve, *stricta* Reeve? *Ovinotis ovina* Gmelin.

NEW SOUTH WALES—*Marinauris hargravesi* Cox, rare, *brazieri* Angas, more common than the previous species; *Notohaliotis ruber* Leach, *coccoradiatum* Reeve.

VICTORIA—*Marinauris emmae* Reeve; *Notohaliotis improbula* Iredale, *coccoradiatum* Reeve; *conicopora* Peron; *Schismotis laevigata* Donovan; *Exohaliotis cyclobates* Peron.

TASMANIA—*Notohaliotis ruber* Leach = *tubifera* Lamarek; *Marinauris emmae* Reeve; *Schismotis laevigata* Donovan.

SOUTH AUSTRALIA—*Marinauris emmae* Reeve, general, *scalaris* Leach, and *roei* Gray, both taken from Yorke Peninsula, westwards; *Notohaliotis improbula* Iredale; *conicopora* Peron; *Schismotis laevigata* Donovan; *Exohaliotis cyclobates* Peron.

SOUTH WESTERN AUSTRALIA—*Marinauris scalaris* Leach, *roei* Gray, *semipliata* Menke; *Schismotis laevigata* Donovan; *Notohaliotis improbula* Iredale; *Sanhaliotis squamata* Reeve, *elegans* Philippi, *funbris* Reeve.

NORTH WESTERN AND NORTH AUSTRALIA—*Sanhaliotis aliena* Iredale, *squamata* Reeve, *stricta* Reeve, *elegans* Philippi; *Marinauris roei* Gray.

The Paper Nautilus *Argonauta nodosa* (Solander 1786) taken on the eastern Gulf St. Vincent Beaches.

The first record of a specimen of *Argonauta nodosa* from the Adelaide side of Gulf St. Vincent was that of a specimen taken by the late Duncan Donaldson in 1935 at Henley Beach, and now in the South Australian Museum Collection.

After the heavy gales of middle July of this year a number of specimens were found on this side of the Gulf; and two were presented to the Museum. The data are:—

- (1) Brighton, an empty shell, taken by A. R. Tilbrook.
- (2) Brighton, taken by a Mr. O'Neill; the dead animal was used as bait.
- (3) Port Noarlunga, taken by Mrs. Angas Johnson, with eggs, resembling tapioca in appearance and size, were estimated at about 20,000, but a portion may have been lost. Presented to the Museum.
- (4) Christie's Beach, taken by S. V. Gray. The alive animal was removed and thrown back into the sea, as it was incorrectly taken to be a common squid occupying the shell.
- (5) West Beach, taken by D. Horsburg. The shell had been damaged and repaired in life.

Other specimens were found at Grange, Semaphore and Glenelg.

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9 Sept. 1943